



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/029,596	10/24/2001	Chung-Yang Huang	M-12150 US	4568

24251 7590 07/09/2003

SKJERVEN MORRILL LLP  
25 METRO DRIVE  
SUITE 700  
SAN JOSE, CA 95110

EXAMINER

LIU, ANDREA

ART UNIT

PAPER NUMBER

2825

DATE MAILED: 07/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/029,596

Applicant(s)

HUANG, CHUNG-YANG

Examiner

Andrea Liu

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-9, 11-17 and 19-28 is/are rejected.
- 7) ☒ Claim(s) 4, 10 and 18 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

1. Claims 1-3, 5-9, 11-17 and 19-28 are rejected under 35 U.S.C. 102(a) as being anticipated by Huang et al.'s article, "Using Word-Level ATPG and Modular Arithmetic Constraint-Solving Techniques for Assertion Property Checking."

As to claims 1-3, 5-7, 11-17, 19-21 and 25-28, Huang et al. teach a method for generating a test vector for functional verification of circuits comprising: Providing a representation of a circuit that comprises control logic component and a datapath logic component (page 2); reading one or more vector generation targets (page 2); performing word-level ATPG justification on the control logic component to obtain a control logic solution (page 2); extracting one or more arithmetic functions for the datapath logic component based on the control logic solution (page 6); and solving the arithmetic functions using a modular constraint solver (page 6).

The reference also teaches the ATPG justification step to comprise performing word-level implication on circuit components related to the targets (page 3). Moreover, page 6 of the Huang et al. reference teaches determining possible solutions for the nonlinear equations and solving them using one possible solution for the nonlinear equations as boundary conditions

Art Unit: 2825

(page 6). With respect to claims that vector generation target comprises a signal value, a relation among a set of signals and a sequence of relations among a set of signals, page 2 of the Huang et al. reference discloses the same.

As to claims 8, 9 and 22-24, Huang et al. disclose a method for performing word-level ATPG justification on a target circuit wherein an internal control signal of the target circuit is identified (page 3); making a decision on such control signal (page 3); performing word-level implication on circuit components related to the target circuit (page 3); determining if a conflict arises from the word-level implication (page 3); and determining if the one or more control signals are justified (page 3).

***Allowable Subject Matter***

2. Claims 4 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The primary reason is obtaining a second control logic solution by backtracking to perform word-level ATPG justification on the control logic component, which is initially dependent on the outcome of solving the one or more arithmetic functions; extracting arithmetic functions for the datapath logic component based on the second control logic solution; and solving the arithmetic functions using the modular constraint solver.

Art Unit: 2825

3. Claim 10 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The primary reason is identifying a second internal control signal of the target circuit in response to determining that the one or more control signals are not justified; making a decision on the identified second internal control signal; performing word-level implication on the circuit components related to the target circuit; determining if a conflict arises from the word-level implication; and determining if the one or more control signals are justified.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrea Liu whose telephone number is (703) 305-4041.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (703) 308-1323. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 1-800/PTO-9199.

Patent Examiner

Andrea Liu



MATTHEW SMITH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800